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ABSTRACT

Within most institutions of higher learning, the typical approach to the integration of new information and communications technologies into the teaching and learning process has involved a heavy reliance on early adopters. This path of least resistance approach has provided organizations with the opportunity to quickly claim a presence in the emerging E-learning world. However, the gap between these early faculty adopters and their majority colleagues remains a chasm. Research indicates that only about 5 to 10 percent of faculty are using new technology in any way that meaningfully changes the teaching and learning process. This paper argues that in order for new technology to make an institute-wide impact on teaching and learning practices it must be goaded from the backroom to take its place on the organization's mainstage. This means it must be resident in the vision and mission statements of the organization and consequently in its business planning activities and documents. This paper demonstrates how the Northern Alberta Institute of Technology in Edmonton, Alberta, Canada has successfully reinvented its technology integration activities through a comprehensive strategic planning exercise. The paper begins by describing the visioning and strategic planning exercise that was undertaken across the organization and then demonstrates how this exercise has brought about an infrastructure and culture of support that has lead to the proliferation of new learning technology activities. It then explores a number of these technology initiatives to demonstrate their genesis in the strategic planning exercise. (AEF)

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A Strategic Planning Approach to Technology Integration: Critical Success Factors.

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A Strategic Planning Approach to Technology Integration: Critical Success Factors

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View Abstract

Introduction

Within most institutions of higher learning the typical approach to the integration of new information and communications technologies into the teaching and learning process has involved a heavy reliance on early adopters. This path of least resistance approach has provided organisations the opportunity to quickly claim a presence in the emerging E-learning world. However, the gap between these early faculty adopters and their majority colleagues remains a chasm. Research indicates that only about 5 to 10 per cent of faculty are using new technology in any way that meaningfully changes the teaching and learning process. (Geoghegan, 1994).

This paper argues that in order for new technology to make an institute-wide impact on teaching and learning practices it must be goaded from the backroom skunkworks to take its place on the organisation's mainstage. This means it must be resident in the vision and mission statements of the organization and consequently in its business planning activities and documents. This paper will demonstrate how The Northern Alberta Institute of Technology in Edmonton, Alberta, Canada has successfully reinvented its technology integration activities through a comprehensive strategic planning exercise.

The paper will begin by describing the visioning and strategic planning exercise that was undertaken across the organisation and then demonstrate how this exercise has brought about an infrastructure and culture of support that has lead to the proliferation of new learning technology activities. The paper will then explore a number of these technology initiatives to demonstrate their genesis in the strategic planning exercise.

Strategic Planning at NAIT

Background

The Northern Alberta Institute of Technology (NAIT) is a technical institute in Edmonton, Alberta, Canada

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that yearly serves 14,500 full-time program students, and over 40,000 continuing education students. In total, more than 55,000 learners come in contact with NAIT each year. NAIT is one of Canada's largest technical institutes and is Canada's largest apprenticeship training institution. It offers over 195 programs ranging from 1-year certificates, to 2-year diplomas, to 4-year applied degrees, as well as a range of customised training and short courses through its Continuing Education and International divisions. The programming mix is diverse ranging from business programs to highly technical specialisations such as Medical Laboratory Technology and Network Engineering Technology. Graduate placement remains high with a 91% graduate placement rate in 2000 within nine months of graduation. NAIT has over 85,000 alumni working around the globe. Internationally NAIT has training ventures in 22 countries around the world. NAIT has an annual operating budget of $155 million for 2001/02. NAIT has a staff complement of approximately 2200 full and part-time employees distributed over 5 campuses.

Strategic planning for the future

In 1997 NAIT undertook a comprehensive institutional visioning process that involved having a strategic dialogue using scenario planning. Traditionally, public educational institutions have relied on governments to define mandates and provide direction. Financial plans and capital budgets were developed internally but the role of colleges and universities was primarily externally defined. With shrinking government budgets, this has changed. Public institutions must define their own mandate, mission, vision and long term strategic plans in an environment of increased competition, accelerating change, less reliance on government funding and increased uncertainty.

Few educational institutions are equipped for this new reality. How do organisations develop long term plans in the face of future uncertainty? How do they build learning and adaptation into the process? How do they ensure understanding and commitment to change throughout the organization?

To meet this challenge, the Northern Alberta Institute of Technology (NAIT) undertook a four-stage planning process involving

1. development of strategic scenarios
2. creation of a new vision and set of key directions
3. refining of the vision and key directions
4. building the strategic business plan to achieve the vision.

The following section focuses on the process, outcomes and experiences at NAIT over a 16-month period.

The original trigger for the strategic planning project was a realisation that there was no long-term plan for the campus. This immediately raised questions about the long-term vision of the institution, its future role as a public institution and the way programs would be delivered in the future. Would NAIT even need a conventional campus in the future?

Visioning Design

It was evident that NAIT needed an in-depth review of its long-term future. A four-stage process was designed as shown in Figure 1. The ultimate objective of the project was to develop a long-term strategic plan for NAIT.

Project Design Stages			
1	2	3	4
Develop Strategic Scenarios	Formulation of Draft Vision	Vision Refinement & Approval	Strategic Business Plan Development

Project Design Stages

1. Develop Strategic Scenarios
2. Formulation of Draft Vision
3. Vision Refinement & Approval
4. Strategic Business Plan Development

Stage 1 of the project was to develop strategic scenarios. Scenarios are alternative descriptions of the future. They focus on identifying the major forces driving change and the key uncertainties facing NAIT as a basis for developing different stories about the future. Scenarios always encompass more than one future, are particularly concerned with structural rather than incremental change and require creative thinking to generate challenging futures for the organization. They are based on the perspective that the future is inherently uncertain and unpredictable. Indeed, to plan on the basis of a single forecast is dangerous.

An important aspect of scenario building involves the value of the process. A critical objective was to inject new thinking into NAIT's future role within society. The scenario process provides a vehicle for dialogue and strategic thinking. It is a highly participatory and intense learning experience. Key objectives of the process were to expand the envelope of thinking about the future, to develop shared understanding of the forces driving change and to identify the critical uncertainties facing the organization. Throughout the process NAIT chose the consultative approach of keeping all staff informed while at the same time inviting their participation and contributions to the scenario dialogue. At NAIT this was the beginning of what is hoped to be an ongoing strategic conversation with staff about NAIT's future.

The output of scenarios is a set of stories describing a range of distinctly different possible future environments within which NAIT will need to operate. These different futures provide a context for defining a new vision for NAIT and identifying and evaluating alternative strategic directions.

Stage 2 of the project was to formulate a new vision for NAIT. The purpose of a vision statement is to articulate a desirable future state as a basis for marshalling enthusiasm and creating alignment. A powerful

vision can motivate individuals and provide direction in ongoing planning and operational decisions. Many vision statements, however, become depreciated as unattainable motherhood statements.

In designing a process for developing a vision, which would be attractive and challenging yet feasible, a unique process was utilized that built the first draft of a comprehensive vision package from 7 key dimensions (mission, culture, technology, resources, funding, competition and constant change). This approach required consideration of trade-offs to ensure it was both realistic and challenging. Staff were invited to assess each of four identified futures developed from the scenarios against these 7 key dimensions and contribute their ideas. Over 1000 strategies and suggestions were contributed. From this process two alternate visions emerged. Through collaborative discussion with NAIT's Board of Governors, one vision was selected to be developed and refined. The goal was for the vision to be comprehensive and inclusive of a vision, mission, set of guiding principles and key directions.

Stage 3 of the project was to refine the draft vision package. A key thrust of this stage was to develop the vision so that it was comprehensive, achievable and supported. These three elements are essential to ensure effective implementation. Once developed, the vision package was analyzed through a gap analysis process to assess its plausibility. The draft vision package was then presented to a variety of staff and external stakeholder groups for input, refinement, to build consensus and support. Finally, the comprehensive vision package was presented to the Board of Governors for approval.

Stage 4 of the project was to develop a three-year business plan based on the Board approved comprehensive vision package and specifically the key strategic directions for the organization. The key direction statements define the overall strategic thrust for NAIT. They define four areas that NAIT needs to focus on to achieve the vision. The purpose is to guide the development of NAIT's three-year strategic business plan. NAIT titled this phase of the project From Vision to Action.

The intent was to ensure operating divisions and departments had wide scope in contributing their own strategies to support the strategic directions of the institution. The people most knowledgeable about department activities are the people working there. Specific goals during this stage were to engage staff in designing their own future, to open the process to their creative ideas, and to gain their support in the process of strategic change. To meet this goal, NAIT's President presented the comprehensive vision as well as 30 identified proposed expected outcomes, to over 1200 NAIT staff in 33 consultation sessions over two month period. Staff groups were then asked to meet and propose strategies to be included in NAIT's three-year business plan. Over 3000 strategies and ideas were submitted. These resulted in eventually 90 strategies selected for inclusion into NAIT's three-year business plan.

As these last statements suggest, a critical design criterion throughout the project was participation. This was critical yet challenging. At each stage, the process was designed to provide relevant and timely information to all of the 2000 faculty and staff and to solicit feedback and ideas. This put tremendous time pressures on the process. Each step in the planning process required timely communication with faculty and staff before the next step in the planning process. The scenario development process that NAIT utilized is included as Appendix A of this paper.

Summary of Strategic Planning Process at NAIT

The Northern Alberta Institute of Technology (NAIT) having less reliance on government funding and direction developed a response to looking into the next ten years using scenario planning as a basis. In the process of visioning a thread throughout the planning was a strategic dialogue with staff. NAIT unfolded a new way of planning in the face of uncertainty, by building learning and adaptation into the process, and ensuring staff understanding and commitment to change. Specifically NAIT undertook a planning process involving

1. development of strategic scenarios
2. creation of a new vision
3. identification of key directions to achieve the vision
4. development of a strategic business plan that takes NAIT from vision to action.

NAIT learned how to develop scenarios, dialogue with staff institute-wide, encompass a vision into business and budget plans, and manage expectations. NAIT in visioning did not try to predict the future but to answer, "How NAIT can anticipate and adjust to change". In answering this question NAIT must now go face the challenges of taking the journey towards 2010 from vision to action. A key theme that emerged through the planning process was the importance of technology in helping NAIT to achieve its goals to 2010. It is from this solid planning base that the importance of technology was identified and provides the rationale, credibility, and buy-in to achieve success in the technology initiatives to which we now turn our attention.

Technology Integration at NAIT

A Key Direction statement that emerged from the planning process described above requires NAIT staff to "Optimize The Use of Technology". A key project that takes this key direction to heart is known as the Logging Our Curriculum project. The first step in the project has involved an institute-wide course-by-course identification of learning outcomes for all courses at NAIT. The outcome statements have been fashioned in a consistent institutional format incorporating an accepted list of verbs that can be classified according to Bloom's taxonomy (Bloom, 1984). The resultant list of greater than 10,000 institute-wide learning outcomes was then moved into a database accessible through a web-based interface. Faculty now uses this database tool to construct digital Learning Outcome Guides that are associated with each and every one of the 10,000 learning outcomes. These Learning Outcome Guides meet an institutionally agreed upon instructional standard that provides the greatest confidence of successful student learning. (Grondland, 2000; Kolb, 1983; McCarthy, 1987, 1981; NAIT, 1998). The positive implications of this institutionally captured and owned digital curriculum are massive considering the challenges that are outlined above.

Industry Relevant Curriculum

A continuing challenge for NAIT programs has been the need to incorporate industry validation recommendations into its curriculum. The new NAIT process allows programs to generate a survey drawn from the curriculum database and distribute this survey to industry over the World Wide Web. The results of that survey inform further curriculum development. Because the curriculum is entirely built upon individual outcomes, the consequent granularity allows instructors to reconstruct courses without complete course overhauls.

Sharing Curriculum

Another advantage of the curriculum database is the opportunity that instructors have to share curriculum across the institution. It is well known that all programs teach to many of the same learning outcomes. For example, learning outcomes associated with basic computer skills, team building, conflict management and Ohm's Law are just a few of the learning outcomes that are critical to student success in many programs at NAIT. However, curricula designed to support these outcomes have traditionally been developed in isolation, program by program. As a shared resource available to all, the curriculum database will allow instructors to both submit their ideas and draw on the curriculum development expertise of their colleagues across the institution. The curriculum model that has been developed is sufficiently flexible to allow instructors to draw on a consistent curriculum framework while at the same time allowing them to bring to bear their own personal teaching artistry.

An Interdisciplinary Resource

Another benefit of the shared database is its interdisciplinary nature. While technological innovation drives a continuing march towards greater industrial technology convergence, technical institutions should naturally look to greater interdisciplinary activity. For example, the cabinet making industry has been revolutionized by the introduction of information technologies into its practices. It is incumbent on tertiary institutions to break down disciplinary walls and ensure that the reality of this convergence in industry is reflected in the form and content of the curriculum that students will encounter.

Avoiding Duplication

The curriculum database will ensure overlapping effort is kept to an absolute minimum. With an instructional staff that numbers 800, it is clear that instructors cannot possibly stay aware of what curriculum development is underway across the institution. The curriculum database provides an accessible means by which an instructor can make choices about what curriculum to develop and what curriculum already exists that they are entitled to use. This comprehensive knowledge management process will help NAIT avoid the unnecessary duplication of effort and at the same time act to magnify the intellectual capital that already exists. For example, the knowledge that a high quality module on Ohm's Law already exists frees an instructor to focus valuable curriculum development time on preparing new modules to meet the emerging demands of industry or on refining modules in areas that pose particular challenges for students.

Customized Programming

Finally, the curriculum database provides an invaluable resource for the business development unit of NAIT to design customized training for a myriad of industry clients. A large and increasing portion of NAIT's revenue comes through providing continuing education services to industry clients who demand a more customized and focussed approach to training. NAIT's outcomes-based format is ideally suited to designing a curriculum that can be quickly and effectively delivered in keeping with the just in time demands of many industry clients.

Broader Implications of the Logging Our Curriculum Project

The Logging Our Curriculum process has served to revolutionize curriculum development at NAIT. But its impact has not been limited to curriculum design processes alone. The information technology understanding required for users of the system is significant and, in fact, exceeded the skill-sets of many of NAIT instructors whose discipline areas were unrelated to information technology. To implement the project required a training regimen that allowed each and every instructor to meet a minimum set of competencies. A flexible schedule of training events was held throughout the academic year to provide upgrading opportunities for instructors. This training, with the expressed purpose of upgrading skill-sets to meet Logging Our Curriculum requirements, has actually served to move the collective IT knowledge of the faculty to an entirely new level. This knowledge is allowing faculty the opportunity to use new learning technologies in ways they never imagined they could as few as 2 years ago. Some of these collateral technology projects are summarized below.

Online Distributed Learning

Digital materials developed through the Logging Our Curriculum project are now easily incorporated into NAIT's Web-based learning management system: WebCT. This has resulted in an exponential two-year increase in WebCT student user accounts from 50 to in excess of 4000.

Mobility programs

The modularized, digital curriculum is ideally suited to student laptop programs. Since the curriculum project began, two NAIT programs have made the decision to require students to obtain laptops in order to for them to take full advantage of the new curriculum. In the case of NAIT's Forest Technology program, students are wirelessly connected through an 802.11b wireless network both in the main campus facility in Edmonton as well as in field facilities in Northern Alberta. This mobility is ideally suited to this highly project-based, and field oriented program.

Distance learning using streaming media

The initial limited move to online curriculum models brings with it the desire on the part of many programs and faculty to push further into the technology. The Realtime and Court Reporting Program at NAIT was one of the first to conclude its Logging activity. Following upon this success they have implemented more advanced Internet streaming technology into its delivery options. This program is now being accessed by students across North America who tune into lecture webcasts and are able to engage in live interaction with the local class. Students also have post class access to the lecture through an online archive of the webcast materials. Student satisfaction rates in this course have consistently been in excess of 90 percent.

Industry Partnerships

NAIT recently signed a 10-year strategic technology agreement with Compaq Canada Corporation that has a value of over $40 million. As an early commitment to the partnership Compaq has contributed $4.2 million toward the construction of a new $50 million information and communications technology centre. A key element of Compaq's interest in partnership was its acknowledgement of the significant, corporate commitment to information technology that is evident in NAIT's digital curriculum project.

Summary

NAIT has made extraordinary strides over the past three years in the integration of technology into teaching and learning practices and by any measure leads the way amongst similar institutions in Canada. This progress has not come about by default but rather through a deliberate planning process. The time for handing off these important shifts in pedagogical practice to a few early adopters has come and gone. The message for educators at the outset of the 21st century is very clear: Technology must play a prominent role in your service to students. The deployment of sound strategic business planning methods will position organisations to succeed in this new learning arena.

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